UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,984	10/23/2003	Olubunmi O. Adetutu	SC12914TP	2441

23125 7590 08/25/2004

FREESCALE SEMICONDUCTOR, INC.
LAW DEPARTMENT
7700 WEST PARMER LANE MD:TX32/PL02
AUSTIN, TX 78729

EXAMINER	
TOLEDO, FERNANDO L	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/691,984	ADETUTU ET AL.	
	Examiner	Art Unit	
	Fernando L. Toledo	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) *29-32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-9,11-17 and 23-27* is/are rejected.

7)☒ Claim(s) *4,5,10,18-22 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20031023*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1 – 28 in the reply filed on 12 July 2004 is acknowledged.

2. Claims 29 – 32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12 July 2004.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Filipiak et al. (U. S. patent 5,918,147 A) in view of Jung et al. (US Patent Application Publication US 2003/0087188 A1).

In re claim 1, Filipiak, in the U. S. patent 5,918,147 A; figures 1 – 13 and related text discloses forming a gate dielectric 52 overlying a substrate 50, a conductive gate electrode 53 overlying the gate dielectric, a barrier layer 541 overlying and in physical contact with the conductive gate electrode, and an anti-reflective coating (ARC) layer 542 overlying and in physical contact with the barrier layer.

Filipiak does not disclose wherein the ARC layer is an organic ARC layer. However, Jung, in the US Patent Application Publication US 2003/0087188 A1 discloses that an organic anti-reflective material, in particular one which prevents back reflection from the surface of or lower layers in the semiconductor device and eliminates the standing waves and reflective notching due to optical properties of lower layers on the wafer, and due to the changes in the thickness of the photosensitive film applied thereon (Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an organic ARC layer in the invention of Filipiak, since as taught by Jung, an organic anti-reflective material, in particular one which prevents back reflection from the surface of or lower layers in the semiconductor device and eliminates the standing waves and reflective notching due to optical properties of lower layers on the wafer, and due to the changes in the thickness of the photosensitive film applied thereon.

5. In re claim 2, Filipiak discloses wherein forming comprises forming a masking layer 55 overlying the organic ARC layer.

6. In re claim 13, Filipiak discloses wherein the conductive gate electrode comprises polysilicon (Column 4, Line 7).

7. Claims 1 – 3, 6 – 9, 11, 12, 14 – 17 and 23 – 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dakshina-Murthy et al. (U. S. patent 6,589,858 B1) in view of Vaartstra (US Patent Application Publication US 2004/0043604 A1) and in view of Jung et al.

In re claims 1, 16 and 26, Dakshina-Murthy, in the U. S. patent 6,589,858 B1; figures 1a – 7 and related text discloses forming a gate dielectric 32 overlying a substrate 30, a conductive

gate electrode 34/36/38/40 overlying the gate dielectric, and an anti-reflective coating (ARC) layer 42.

Dakshina-Murthy does not show a barrier layer and an organic ARC layer. However, Vaartstra, in the US Patent Application Publication US 2004/0043604 A1; figures 1 – 3 and related text, discloses that barrier layers improve adhesion and diffusion resistance (Paragraph 0006).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a barrier layer in contact with the gate electrode of Dakshina-Murthy, since, as taught by Vaartstra, barrier layers improve adhesion and diffusion resistance.

Dakshina-Murthy in view of Vaartstra, does not disclose wherein the ARC layer is an organic ARC layer. However, Jung, discloses that an organic anti-reflective material, in particular one which prevents back reflection from the surface of or lower layers in the semiconductor device and eliminates the standing waves and reflective notching due to optical properties of lower layers on the wafer, and due to the changes in the thickness of the photosensitive film applied thereon (Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an organic ARC layer in the invention of Dakshina-Murthy in view of Vaartstra, since as taught by Jung, an organic anti-reflective material, in particular one which prevents back reflection from the surface of or lower layers in the semiconductor device and eliminates the standing waves and reflective notching due to optical properties of lower layers on the wafer, and due to the changes in the thickness of the photosensitive film applied thereon.

8. In re claims 2 and 16, Dakshina-Murthy discloses wherein forming comprises forming a masking layer 44 overlying the organic ARC layer.

9. In re claims 3, 16 and 17, Dakshina-Murthy discloses further comprising removing the masking layer and the organic ARC layer to form a stack (Figure 6).

10. In re claims 6 and 16, Dakshina-Murthy discloses wherein the conductive gate electrode comprises a metal (Column 5, Lines 5 and 36).

11. In re claims 7 and 23, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer is further characterized as an oxygen resistant barrier layer (Paragraph 0006).

12. In re claims 8 and 24, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer comprises at least one of silicon and nitrogen (Paragraph 0006).

13. In re claim 9, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer comprises silicon and nitrogen (Paragraph 0006).

14. In re claims 11 and 25, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer comprises a metal whose oxides are conductive (Paragraph 0006).

15. In re claim 12, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer comprises amorphous silicon (Paragraph 0006).

16. In re claims 14 and 27, Dakshina-Murthy in view of Vaartstra discloses wherein the barrier layer has a thickness in a range of approximately 20 Angstroms to 500 Angstroms (Paragraph 0046).

17. In re claim 15 Dakshina-Murthy and Vaartstra in view of Jung discloses wherein the organic ARC layer comprises carbon (Abstract).

Claim Objections

18. Claims 4, 5, 10, 18 – 22 and 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando L. Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Mon-Thu 7am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Fourson
Primary Examiner
Art Unit 2823

FToledo
20 August 2004